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ABSTRACT

The purpose of this study was to isolate factors responsible for the discrepant results reported in the advanced organizer literature, and to identify processes children employ when attempting to recall connected verbal materials. The subjects were 64 middle-class children randomly selected from a local school system. An equal number of male and female first- and fourth-grade children were employed. All subjects either received or did not receive an advanced organizer prior to the oral presentation of a passage containing sentences which were either relevant or irrelevant to the main theme of the story. From the results it was concluded that older children who did not receive the advanced organizer generated their own advanced organizer, thus facilitating their recall of relevant thematic information at the expense of irrelevant recall. (Author/TS)

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ADVANCED ORGANIZERS, AGE, AND THE RECALL OF RELEVANT VERSUS IRRELEVANT THEMATIC INFORMATION

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The study was designed to isolate factors responsible for the discrepant results reported in the advanced organizer literature and identify processes children employ when attempting to recall connected verbal materials. First and fourth grade children either received or did not receive an advanced organizer prior to the oral presentation of a passage containing sentences which were relevant and irrelevant to the main theme of the story. Results showed that older children who did not receive the advanced organizer generated their own advanced organizer, thus facilitating their recall of relevant thematic information at the expense of irrelevant recall.

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At least four different theoretical frameworks have found it useful to conceptualize memory as the result of specific activities or processes in which the human organism engages. From the Soviet literature, Smirnov and Zinchenko (1969) have argued that memory is primarily the outcome of goal-oriented behavior. Hence, in order to exhibit memory, the subject must incorporate the material to-be-remembered in some sort of activity which leads to the goal. Similarly, Piaget et al. (1968) have conceptualized memory as the result of the organism's active assimilation of information into existing cognitive structures. American information processing and cognitive theorists have also emphasized the importance of the organism's activities or processes in memory. Cognitive theorists, such as Craik and Lockhart (1972) for example, have viewed memory as the product of a particular level of processing. According to these theorists, deeper or more semantic levels of processing are associated with greater memory trace persistence. Simon (1972) states that information processing theorists are consistent in conceptualizing long term memory as the storage of programs or strategies which a subject employs in order to retrieve information.

Although this theoretical framework has been useful in characterizing memory for a variety of materials, it offers little insight into the nature of the activities Ss employ when attempting to recall connected verbal materials.

The bulk of the theorizing surrounding the retention of connected verbal materials has been provided by Ausubel (1960, 1963). Ausubel (1963)

maintains that the human organism's cognitive structure is hierarchically organized in terms of highly inclusive concepts. Moreover, he argues that the most efficient way to facilitate the retention of prose materials is to introduce the appropriate subsumers and make them part of the cognitive structure prior to the actual presentation of the passage. These subsumers have been called advanced organizers. Briefly, advanced organizers are introductory prose passages that are written at a higher level of generality and inclusiveness than the actual learning material. Unfortunately, studies attempting to demonstrate the facilitative effects of advanced organizers have yielded contradictory results; some investigators have reported positive results (Ausubel, 1960; Ausubel and Fitzgerald, 1962) while others have obtained negative results (Barron, 1971).

In light of the notion that memory is the result of specific activities that the organism engages in, it is conceivable that one of the factors responsible for these contradictory findings is the tendency for Ss to actively generate their own advanced organizers. More specifically, advanced organizers would not be expected to show their facilitative effects if subjects not receiving the advanced organizer actively generated their own during passage presentation. Accordingly, the current research was designed to test this possibility. Furthermore, although Ausubel and others have suggested that advanced organizers facilitate retention by mobilizing relevant concepts in the individual's cognitive structure, prior studies have failed to distinguish between the effects of advanced organizers on sentences which are relevant versus irrelevant to the main theme of the story being conveyed. The present study therefore employed a passage containing an equal number of thematically relevant and irrelevant idea units.

Finally, in view of the importance recent theorizing on memory has placed on the activities carried out by the organism, it is not surprising that a large number of developmental memory theorists have argued that memory development is largely the development of appropriate mnemonic activities (Meacham, 1971; Corsini, 1971) or routines (Flavell, 1971). In this context, recall increases with age primarily because older children typically employ more efficient or appropriate mnemonic activities than younger children. In the current study, it was hypothesized that the appropriate mnemonic activity for subjects not receiving the advanced organizer would be the spontaneous generation of their own advanced organizer. Thus, it was expected that older children would be better able to generate their own advanced organizer and consequently recall more information than younger children.

Clearly, the objectives of this study were twofold: First, the study was designed to clarify a portion of the existing literature on advanced organizers by isolating some of the factors responsible for the discrepant results reported. And second, it was designed to provide some insight into the nature of memory development by focusing on the processes or activities children employ when attempting to recall connected verbal materials.

Methods

Subjects

The subjects were 64 middle class children randomly selected from a local public school system. An equal number of male and female children from first and fourth grade were employed. The median age for the first and fourth grade children was 6-11 and 9-10 respectively.

Stimulus Materials

A 387-word passage containing 38 sentences or idea units was employed. The passage was constructed so that it was grammatically well-formed but difficult to comprehend without the subjects' knowledge of the main theme of the story. Various characteristics of the passage were determined in an exploratory study carried out with 15 undergraduate students. All of the students were asked to describe what they felt was the main theme of the passage. In addition, the students were asked to assess whether each idea unit was relevant or irrelevant to the main theme of the story. In all, the students judged 19 idea units relevant and 19 idea units irrelevant to the main theme. Agreement on each idea unit ranged from 100% agreement on 15 units to 73% agreement on two units. Taken together, 87% of the responses were in agreement in identifying relevant idea units, while 96% of the judgments were in agreement on what they considered irrelevant idea units. A similar procedure for determining various characteristics of passages has been successfully employed and reported elsewhere (Christie and Schumacher, in press). The advanced organizer was a one-sentence statement expressing the main theme of the passage. In addition, it was written at a higher level of generality than the actual story. The following is the advanced organizer along with a portion of the passage which was presented. The first 15 idea units are illustrative; and the symbols (R) and (I) indicate whether the idea unit was judged relevant or irrelevant to the main theme of the story.

The story you will hear is about a parade that people are gathered to watch (advanced organizer).

A crowd of about 100 people were gathered standing at the edge of the street (R). The first thing the crowd could see was cars with lights

that flashed on and off (R). All of the buildings by the street had red roofs (I). Sirens on the cars were blowing (R). Men with funny painted faces riding bicycles were then seen (R). Birds were singing very loudly (I). A kite was flying high in the sky (I). One of the men with a funny painted face fell off the bicycle to make the people laugh (R). Then he took his hat off and threw it in the air (R). It was easy to hear a dog that was barking very loud (I). The man got back on the bicycle and rode down the street in circles (R). One of the children got splashed with a water balloon (I). And another child was playing with a truck on the sidewalk (I). A line of people walking down the street carrying flags could be seen (R). Behind the flag carriers was a big band playing songs (R).

Design

A design with two between and one within factor was employed. The between factors were presence or absence of the advanced organizer and age. The within factor was relevant versus irrelevant information.

Procedure

Two Es were randomly assigned one-half of the Ss from each condition (grade level and presence versus absence of advanced organizer). The passage was tape recorded and presented to all Ss individually. Care was taken to ensure that equal emphasis was placed on relevant and irrelevant sentences. Prior to passage presentation, all Ss were informed that they would hear a story after which they would be required to recall as much of the story as possible. Subsequently, one-half of the subjects from each grade level were given the advanced organizer while the remaining were not. After the presentation of the passage, all Ss were given a two minute

interpolated task. The purpose of this task was to eliminate the possibility of rehearsal. The task consisted of circling designated letters from a list of 500 randomly selected letters on a 9" by 12" sheet of paper. All Ss were then asked to tell the E everything they could remember about the story and that the more they could remember, the better. Each S's reconstruction of the story was then taped and later transcribed. Immediately following recall, Ss who did not receive the advanced organizer were given a five-foil multiple choice question in order to determine whether or not they had generated the advanced organizer during passage presentation. Approximately 88% of the older Ss and 55% of the younger Ss chose the foil containing the advanced organizer, indicating that they had generated the main theme during passage presentation. Ss who chose the foil containing the advanced organizer were then asked to state the sentence at which they first realized what the main theme of the story was. The percentage of Ss who successfully recalled the sentence at which they generated their own advanced organizer was 88%, while the remaining 12% did not. Ss unable to recall the sentence were probed with various sentences from the passage by E. These Ss then informed the E when they recognized the sentence at which the main theme of the story was discovered.

Two judges were employed to determine independently the number of relevant and irrelevant idea units recalled by each S. Judges considered an idea unit correctly recalled if it appeared in the S's reconstruction without substantial alteration of meaning. Inter-judge reliability coefficients for the number of relevant and irrelevant idea units recalled were .97 and .98 respectively.

Results

An analysis of variance on recall scores yielded a significant main effect for Age ($p<.01$). As expected, older Ss recalled a greater number of idea units than younger Ss. In terms of the Relevant-Irrelevant dimension, all Ss tended to recall a greater number of relevant than irrelevant idea units ($p<.01$). The main effect for the advanced organizer manipulation was not significant.

Although the presence or absence of the advanced organizer did not produce significant differences in total recall, a significant two-way interaction between the advanced organizer manipulation and the recall of relevant versus irrelevant information was obtained ($p<.01$). The Advanced Organizer by Relevant-Irrelevant Interaction is graphically illustrated in figure 1. The interaction was further analyzed with Cicchetti's post test

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Insert figure 1 about here

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(1972). The results of this test revealed that subjects who did not receive the advanced organizer recalled significantly more relevant than irrelevant information ($p<.05$).

In addition, a significant triple interaction ($p<.01$) showed that the two-way interaction was primarily due to the performance of older Ss. Hence, older but not younger Ss who did not receive the advanced organizer recalled more relevant than irrelevant information ($p<.01$). The triple interaction is depicted graphically in figure 2.

Insert figure 2 about here

Finally, the information Ss provided concerning the specific sentence at which they obtained knowledge of the main theme of the story (i.e., generated their own advanced organizer), was examined. As expected, older Ss generated their own advanced organizer at an earlier point in the passage than did younger Ss ($t = 3.75$, $df = 30$, $p<.01$). In order to determine whether older Ss' generation of the advanced organizer accounted for an age related increase in the recall of relevant information ($p<.01$), the correlation between relevant recall and the sentence at which each subject generated the advanced organizer was computed. A significant correlation of -.41 ($p<.01$) was obtained indicating that the earlier a subject generated the advanced organizer, the higher his relevant recall was. Moreover, the age related increase in the recall of relevant information by Ss who did not receive the advanced organizer was no longer significant when the point at which Ss generated the advanced organizer was used as a covariate ($p>.05$).

Discussion

The results help to clarify the role of advanced organizers on prose retention. It is apparent that a large portion of the discrepant results reported in prior research on advanced organizers is due to the failure to take into account the possibility that subjects who do not receive the advanced organizer actively generate their own advanced organizer. More specifically, the current study employed a passage which was constructed in such a manner that some Ss could generate their own advanced organizer while others could

not. The results clearly showed that Ss who actively generated their own advanced organizer recalled a greater amount of relevant thematic information than Ss who did not generate an advanced organizer. Extrapolating from these findings, it would be expected that advanced organizers would be most likely to show their facilitative effects when Ss who do not receive the advanced organizer are unable to actively generate their own advanced organizer. Indeed, several studies have provided evidence supporting this claim (Bransford and Johnson, 1972; Dooling and Lachman, 1971; Dooling and Mullet, 1973). Dooling and Mullet (1973), for example, asked Ss to read and recall vague metaphorical stories that were difficult to comprehend. Prior to reading the material, half of the Ss were given a title that allowed them to comprehend the story, while the remaining Ss did not receive the title. The results clearly showed that Ss receiving the thematic title recalled more information from the story than Ss who did not receive the title. In short, since the passages were vague and metaphorical, Ss were unable to generate their own thematic structure or advanced organizer for the passage and consequently recalled less information than Ss who were presented the thematic title. It could be argued that the thematic titles employed by these investigators are not comparable to advanced organizers. However, an inspection of these thematic titles reveals that although they are typically shorter in length than advanced organizers, they are similar to advanced organizers in that they are written at a higher level of generality and inclusiveness than the actual passage to-be-retained. Clearly, in order to adequately assess the influence of advanced organizers on the retention of prose, future investigators should take into account the possibility that Ss who do not receive the advanced organizer actively generate a substantively equivalent form of the

advanced organizer during passage presentation.

In addition, a second factor which must be considered in order to accurately examine the relationship between advanced organizers and retention was provided by the manipulation of relevant versus irrelevant idea units. In the present study, Ss who did not receive the advanced organizer recalled a greater amount of relevant than irrelevant thematic information. On the other hand, Ss who received the advanced organizer tended to recall an equal amount of relevant and irrelevant information. These findings suggest that gross measures of retention, or measures which are insensitive to the nature of the information retained, will necessarily obscure the relationship between advanced organizers and retention. Moreover, although Ss not receiving the advanced organizer improved their recall of relevant information, they had a consonant drop in the recall of irrelevant information. Therefore, no overall effect of the advanced organizer was obtained. This is consistent with the notion that a fixed amount of information can be processed in a given amount of time. Perhaps a more radical consequence of these findings is the suggestion that advanced organizers do not appear to facilitate recall by providing a structure which Ss employ to subsume the information they glean from a passage. Rather, when the materials contain relevant and irrelevant thematic information, the presence or absence of an advanced organizer seems to direct the nature of the information that will be processed for retention. So viewed, advanced organizers may be conceptualized as an orienting statement which suggests to the S what kind of information should be processed.

Although further research is needed, the current study also offers some practical implications concerning the retention of prose. The results

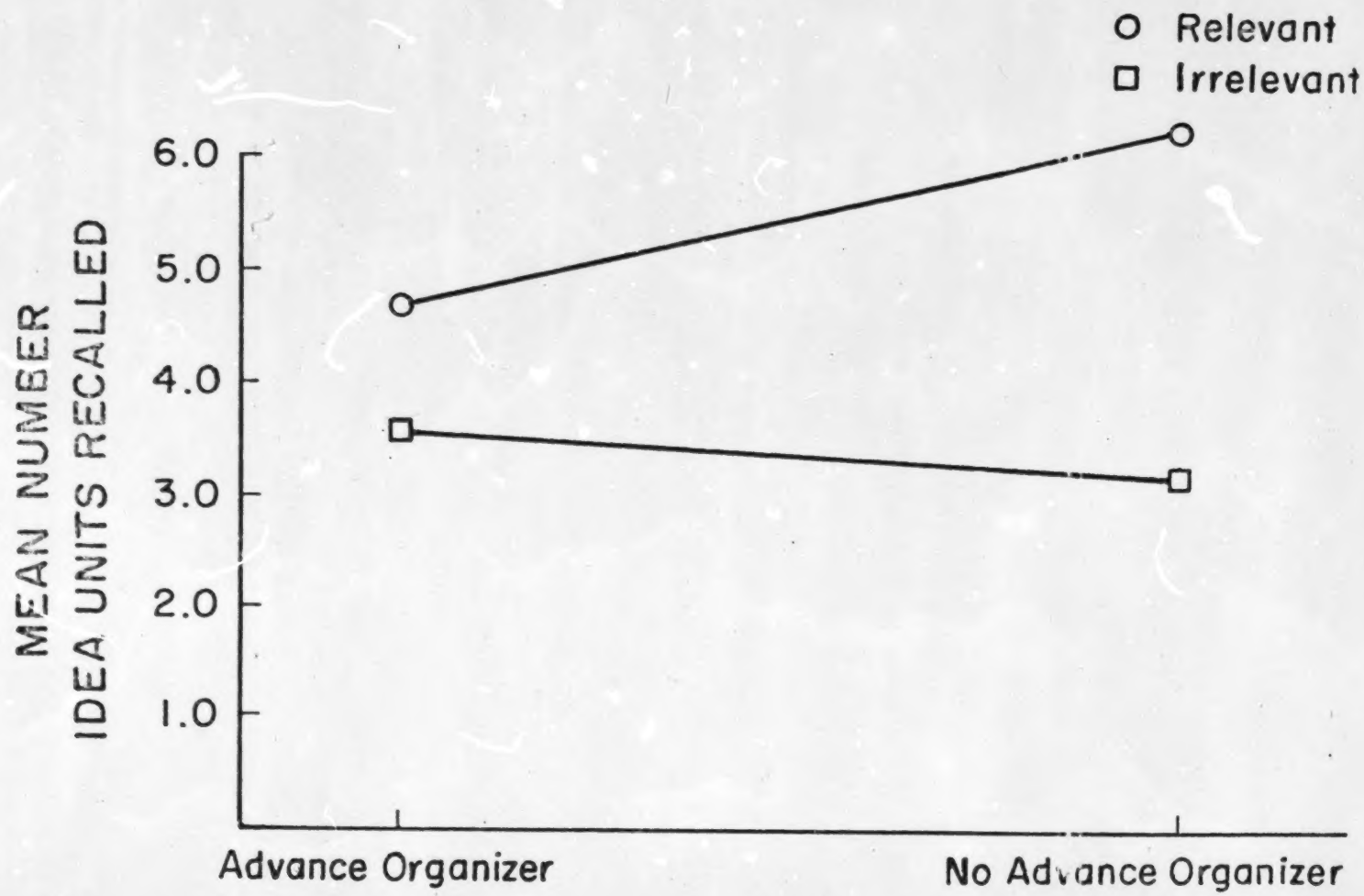
suggest that when passages are relatively easy to comprehend and contain relevant and irrelevant information, the presentation of an advanced organizer may tend to direct the S away from processing relevant thematic information. Under these conditions, it appears as though the retention of relevant thematic information is best served by permitting Ss to generate their own structure for the passage. This suggestion is consistent with the results reported by Smirnow and Zinchenko (1969) along with Schumacher, Liebert, and Fass (1974). These investigators offer evidence for the notion that under certain conditions, subject generated plans lead to better recall than does an experimenter generated plan. In the current study, the S's active generation of an advanced organizer is essentially a subject generated plan while the presentation of an advanced organizer is comparable to an experimenter generated plan.

Finally, the results indicate that there are important developmental changes in the way children process prose information. The superior performance of Ss not receiving the advanced organizer was related to older Ss' active generation of their own advanced organizer and the relative failure of younger Ss to do so. Apparently older children are more adept at knowing what to do at input of prose material in order to be able to recall at a later point in time. This finding is very consistent with Flavell's (1971) recent argument concerning the lack of planfulness young children exhibit when presented materials to be recalled.

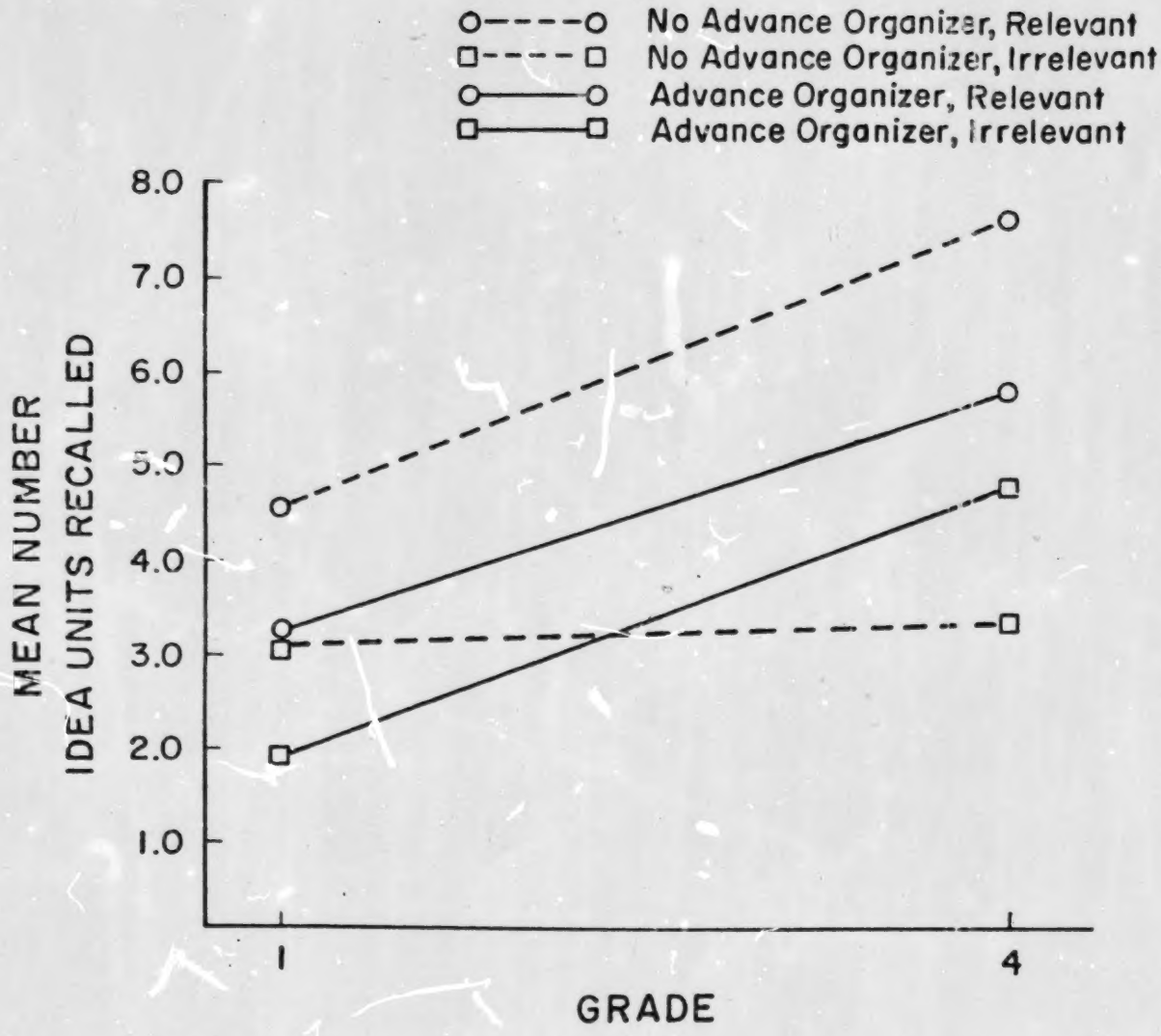
In short, the current research strongly suggests that when Ss are not given an advanced organizer, they actively search for some highly inclusive structure which will provide the context within which the story takes place. In addition, this searching activity tends to direct the S toward processing

relevant thematic information at the expense of irrelevant information. Finally, it is clear that older Ss are far more capable of finding such a structure than are younger Ss.

In view of these findings it appears as though an adequate conceptualization of memory for prose must take into account the types of activities which the S normally tries to carry out. Activities which are, in part, determined by the age of the S and constrained by the nature of the stimulus materials. In addition, the current study strongly suggests that it is important to differentiate between the various types of information which a particular activity leads the S to process. Studies which fail to carefully control or manipulate any of these factors are likely to generate results which are uninterpretable and misleading.



(Figure 1. Advanced Organizer by Relevant-Irrelevant Interaction)



(Fig. 2. Interaction between Advanced Organizer manipulation, Age, and Relevant vs. Irrelevant recall)

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FOOTNOTES

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